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UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE BOARD OF PATENT APPEALS  
AND INTERFERENCES

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*Ex parte* SHIGERU SUZUKI, TAKESHI ODA,  
and NORIHIRO SHIMIZU

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Appeal 2009-002641  
Application 10/530,480  
Technology Center 1700

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Decided:<sup>1</sup> June 30, 2009

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Before ADRIENE LEPIANE HANLON, CHUNG K. PAK, and  
JEFFREY B. ROBERTSON, *Administrative Patent Judges*.

PAK, *Administrative Patent Judge*.

DECISION ON APPEAL

Appellants appeal under 35 U.S.C. § 134(a) from the Examiner's final rejection of claims 1 through 23, 28, and 29. Claims 24 through 27, the

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<sup>1</sup> The two-month time period for filing an appeal or commencing a civil action, as recited in 37 C.F.R. § 1.304, begins to run from the Decided Date shown on this page of the decision. The time period does not run from the Mail Date (paper delivery) or Notification Date (electronic delivery).

other pending claims in the above-identified application, stand withdrawn by the Examiner. We have jurisdiction under 35 U.S.C. § 6(b).<sup>2</sup>

We REVERSE and enter a NEW GROUND OF REJECTION pursuant to 37 C.F.R. § 41.50(b).

### STATEMENT OF THE CASE

The subject matter on appeal is directed to a heat shrinkable film comprising 50 to 95 mass% of a block copolymer containing an aromatic vinyl compound and a conjugated diene and having a micro phase separation structure comprising a soft phase and hard phase, 5 to 50 mass% of a styrene type polymer having a syndiotactic structure and 0 to 45 mass% of a styrene type polymer different from the aromatic vinyl compound (Spec. 5). “The block copolymer preferably has a structure in which the aromatic vinyl compound and the conjugated diene are bonded at random . . . .” (Spec. 6). The aromatic vinyl compound employed includes, *inter alia*, “styrene, o-methylstyrene, p-methylstyrene, p-tert-butylstyrene, 2, 4-dimethylstyrene, [and] 2, 5-dimethylstyrene” (Spec. 7-8). The conjugated diene employed includes, *inter alia*, “1, 3-butadiene, 2-methyl-1, 3-butadiene (isoprene), 2, 3-dimethyl-1, 3-butadiene, 1, 3-pentadiene or 1, 3-hexadiene” (Spec. 8).

Examples 1 through 8 at pages 45 through 53 of the Specification are directed to preparing “[a] styrene/styrene butadiene random copolymer/styrene block copolymer” (a block copolymer having an aromatic vinyl compound and a conjugate diene) (Spec. 45). These Examples show that the timing and number of the addition of monomers can determine the formation of a micro phase separation structure comprising soft and hard

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<sup>2</sup> An oral hearing was held on May 13, 2009.

phases in block copolymers (Spec. 45-53 and 65). Example 1 shows anionic polymerization of a mixture of a polymerization solvent (cyclohexane), a styrene monomer, and a polymerization catalyst solution containing cyclohexane and n-butyllithium (Spec. 45). "After the rate of polymerization of the styrene monomer exceeded 99%, while keeping the temperature in the reaction system at 80°C," a styrene monomer and butadiene were simultaneously added at a constant rate and held for 5 minutes after completion of the addition (Spec. 45-46). Subsequently, an additional amount of a styrene monomer was added all at once to complete the polymerization (Spec. 46). Water was then added to deactivate all the polymerizable active terminals and obtain a polymer liquid containing a polymer having a polystyrene block portion and a random structure of styrene and butadiene (*id.*). The resulting polystyrene block copolymer, however, has no micro phase separation structure (Spec. 65, Table 1). On the other hand, Examples 2 through 8 form block copolymers having micro phase separation structures by repeating essentially the same preparation steps as Example 1, with an additional step of adding a substantial amount of additional butadiene all at once after the simultaneous constant addition of a styrene monomer and butadiene, but before the addition of the additional amount of the styrene monomer (Spec. 46-53 and 65). According to page 7, lines 14-22, of the Specification:

The block copolymer having a micro phase separation structure comprising a soft phase and a hard phase comprises a hard phase with a high styrene mass ratio and a soft phase with a low styrene mass ratio, and such a micro phase separation structure can be judged by employing a means of image analysis by a transmission electron microscope or by two or more glass transition

temperatures obtained by DSC or dynamic viscoelasticity spectrum measurement being observed.

Details of the appealed subject matter are recited in representative claim 1 reproduced below:

1. A heat shrinkable film comprising a resin composition comprising the following components (A), (B) and (C), obtained by orientation at least in monoaxial direction, and having a heat shrinkage ratio at 80°C for 10 seconds of at least 20%:

(A) 50 to 95 mass% of a block copolymer comprising an aromatic vinyl compound and a conjugated diene in a proportion of the aromatic vinyl compound of from 50 to 90 mass%, and having a micro phase separation structure comprising a soft phase and a hard phase,

(B) 5 to 50 mass% of a styrene type polymer having a syndiotactic structure, and

(C) 0 to 45 mass% of a styrene type polymer different from the components (A) and (B).

The Examiner relied upon the following as evidence of unpatentability:

Shiraki	US 4,386,125	May 31, 1983
Lind	US 6,074,715	Jun. 13, 2000
Teranishi	US 6,184,289 B1	Feb. 6, 2001
Matsui	US 6,841,261 B2	Jan. 11, 2005

The Board newly relies upon the following prior art:  
Appellants' admission at pages 2 and 3 of the Specification (hereinafter referred to as "the admitted prior art").

The Examiner rejected the claims on appeal as follows (Ans. 3-13):

1) Claims 1 through 20, 22, 23, 28, and 29 under 35 U.S.C. § 103(e) as unpatentable over Matsui in view of Lind with evidence of Shiraki; and

2) Claim 21 under 35 U.S.C. § 103(a) as unpatentable over Matsui in view of Lind with evidence of Shiraki and Teranishi.

The Examiner relied on Matsui to teach, *inter alia*, a heat shrinkable film comprising the claimed amount of a block copolymer having an aromatic vinyl compound and a conjugated diene in the claimed proportion and a micro phase separation structure comprising soft and hard phases, and the claimed amount of a styrene type polymer (Ans. 3-12). The Examiner relied on the written description at column 8, line 64 to column 10, line 51 of Matsui for the micro phase separation structure (Ans. 3 and 13). The styrene type polymer generically taught by Matsui, according to the Examiner, is inclusive of a styrene type polymer having a syndiotactic structure (Ans. 14). However, the Examiner recognized that Matsui does not specifically mention a syndiotactic styrene type polymer (Ans. 3-5).

To remedy this deficiency, the Examiner relied on Lind to show that the use of a styrene type polymer having a syndiotactic structure imparts certain benefits to heat shrinkable films (Ans. 4-5 and 14). The Examiner then concluded (Ans. 5):

[I]t would have been obvious to one having ordinary skill in the art to substitute a syndiotactic polystyrene for a styrene polymer of Lind ('715) [sic., Matsui] in order to provide a strong heat shrinkable multilayered structure.

The Examiner also relied on Shiraki to show that the claimed heat shrinkage factor is necessarily or obviously present in Matsui's heat shrinkable film (Ans. 4). Further, the Examiner relied on Teranishi to show

that the rubber particles recited in claim 21 are known to have optimal strength and transparency (Ans. 12-13).

Appellants traverse the Examiner's rejections, arguing, among other things, that no block copolymer having a micro phase separation structure is described at column 8, line 64 to column 10, line 51 of Matsui (App. Br. 6 and Reply Br. 1).

### ISSUE AND CONCLUSION

Have Appellants identified reversible error in the Examiner's finding that a block copolymer having the claimed micro phase separation structure is described at column 8, line 64 to column 10, line 51 of Matsui? On this record, we answer this question in the affirmative.

### RELEVANT FINDINGS OF FACT

1. Matsui teaches, at column 8, line 64 to column 10, line 51, a block copolymer comprising a vinyl aromatic hydrocarbon and a conjugated diene.
2. Matsui teaches (col. 9, ll. 28- 40) that:

As the vinyl aromatic hydrocarbon used in each of the block copolymers (A), (A2) and (A3) . . . styrene, o-methylstyrene, p-methylstyrene, p-tert-butylstyrene, 2, 4-dimethylstyrene, 2, 5-dimethylstyrene . . . .

Further, the conjugated diene may, for example, be 1,3-butadiene, 2-methyl-1,3-butadiene (isoprene), 2,3-dimethyl-1,3-butadiene, 1,3-pentadiene or 1,3-hexadiene, and particularly preferably 1,3-butadiene or isoprene may be mentioned.

3. Matsui teaches that the block copolymer has a weight average molecular weight of preferably from 50,000 to 500,000 and more preferably from 100,000 to 300,000 (col. 9, ll. 47-56).

4. Matsui teaches (col. 9, ll. 42-46) that the weight ratio of the vinyl aromatic hydrocarbon and the conjugated diene in the block copolymer is not particularly limited, however, the weight ratio of the conjugated diene is preferably within a range of from 5 to 40% [i.e., a proportion of the aromatic vinyl hydrocarbon of from 60 to 95 mass%], more preferably from 7 to 30% [a proportion of the vinyl aromatic hydrocarbon of from 70 to 93 mass%].
5. Matsui teaches (col. 10, ll. 5-13) that:

[T]he molecular weight and the molecular structure of the copolymer in the present invention can be controlled depending upon the purpose, by optionally changing the charge amount, the timing of addition and the number of addition of the monomers, the polymerization initiator, the randomizing agent, and the proton donating substance used for deactivation of active terminals (hereinafter referred to as “polymerization terminator”).
6. Matsui does not expressly describe or mention anywhere at column 8, line 64 to column 10, line 51, the claimed micro phase separation structure.
7. Nor has the Examiner shown that the relied upon columns and lines of Matsui inherently or impliedly describe a block copolymer having the claimed micro phase separation structure (Ans. 3-16)
8. Appellants rely upon Specification Examples 1 through 8 to show that the use of the same aromatic vinyl hydrocarbon and conjugated diene in an anionic polymerization would not necessarily result in the formation of a block copolymer having the claimed micro phase separation structure (App. Br. 4-5)
9. The Examiner does not discuss the propriety of Specification Examples 1 through 8 relied upon by Appellants (Ans. 3-16).



## PRINCIPLES OF LAW

Under 35 U.S.C. § 103, the factual inquiry into obviousness requires a determination of: (1) the scope and content of the prior art; (2) the differences between the claimed subject matter and the prior art; (3) the level of ordinary skill in the art; and (4) secondary considerations, if any. *Graham v. John Deere Co.*, 383 U.S. 1, 17-18 (1966).

As stated in *KSR Int'l Co., v. Teleflex, Inc.*, 550 U.S. 398, 417-18 (2007):

“[A]nalysis [of whether the subject matter of a claim would have been prima facie obvious] need not seek out precise teachings directed to the specific subject matter of the challenged claim, for a court can take account of the inferences and creative steps that a person of ordinary skill in the art would employ.”

Nevertheless, “rejections on obviousness grounds cannot be sustained by mere conclusory statements; instead, there must be some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness.” *Id.* (quoting *In re Kahn*, 441 F.3d 977, 988 (Fed. Cir. 2006)).

## ANAYLSIS

The columns and lines of Matsui relied upon by the Examiner do not expressly describe a block copolymer having the claimed micro phase separation structure. Nor has the Examiner demonstrated that the relied upon columns and lines of Matsui inherently or impliedly describe a block copolymer having the claimed micro phase separation structure.

It follows that the Examiner reversibly erred in finding that a block copolymer having the claimed micro phase separation structure is described

at column 8, line 64 to column 10, line 51 of Matsui. Accordingly, we reverse the Examiner's rejections of the claims on appeal under 35 U.S.C. § 103(a).

#### NEW GROUND OF REJECTION

We enter a new ground of rejection pursuant to our authority under 37 C.F.R. § 41.50(b).

Claim 1 is rejected under 35 U.S.C. § 103(a) as unpatentable over the combined teachings of Matsui and the admitted prior art.

#### ADDITIONAL RELEVANT FINDINGS OF FACT

10. Matsui teaches forming a heat shrinkable (multilayer) film containing at least one block copolymer (A and B2) having a vinyl aromatic hydrocarbon and a conjugated diene and a vinyl aromatic hydrocarbon polymer (B1), such as polystyrene or a high-impact polystyrene (col. 14, ll. 14-63).

11. Matsui teaches (col. 14, ll. 59-62) that:

polystyrene may be used together in order to increase the rigidity of the obtained film, a high-impact polystyrene may be used together with a purpose of improving blocking properties.

12. Matsui teaches (col. 15, l. 64 to col. 16, l. 10) that:

In the present invention, the amount of the vinyl aromatic hydrocarbon polymer (B1) to (B3) is preferably at most 100 parts by weight based on 100 parts by weight of the block copolymer (A) . . . .

Further, in a case where the vinyl aromatic hydrocarbon polymer (B1) is an opaque high-impact polystyrene, its amount is at most 20 parts by weight . . . .

13. Matsui teaches that the heat shrinkable film may be obtained by extruding a film and orienting the film uniaxially, biaxially or multi-axially (col. 17, ll. 28-38).
14. Matsui teaches that “[w]hen such a film is used as a heat shrinkable label or a packaging material, the heat shrinkage factor is at least 15% at 80° C” (col. 17, ll. 43-50).
15. Matsui exemplifies a heat shrinkable film having a heat shrinkage factor of greater than or equal to 20% at 80°C for 30 seconds (cols. 35 and 36, Table 1).
16. Matsui exemplifies forming block copolymers in processes identical to or substantially identical to Specification Examples 2 through 8, which, according to Appellants, are responsible for the formation of the claimed micro phase separation structure having soft and hard phases (*Compare* Spec. 46-54 and 65 *with* Matsui, col. 26, Reference Examples 20 and 21).
17. Matsui does not mention that its styrene type polymer has a syndiotactic structure. (*See generally* Matsui).
18. Appellants do not dispute the Examiner’s finding that the styrene type polymer taught by Matsui generically includes a polystyrene polymer having a syndiotactic structure (*Compare* Ans. 14 *with* Reply Br. 2).
19. Appellants acknowledge that the use of a polystyrene type polymer having a syndiotactic structure in forming a heat shrinkable film was well known at the time of the invention (Spec. 2, l. 8 to 3, l. 1).
20. Appellants acknowledge that using a styrene polymer having a syndiotactic structure, together with a styrene/diene type block copolymer, to form a multilayered oriented laminated film was well known at the time of the invention (Spec. 3, ll. 2-8).

21. Appellants acknowledge that specific ranges of the melting point and the crystallization temperature were known to be important in forming the film discussed above (Spec. 3, ll. 8-16).

### PRINCIPLES OF LAW

Under 35 U.S.C. § 103, the factual inquiry into obviousness requires a determination of: (1) the scope and content of the prior art; (2) the differences between the claimed subject matter and the prior art; (3) the level of ordinary skill in the art; and (4) secondary considerations, if any. *Graham*, 383 U.S. at 17-18.

As stated in *KSR*, 550 U.S. at 417-18:

“[A]nalysis [of whether the subject matter of a claim would have been prima facie obvious] need not seek out precise teachings directed to the specific subject matter of the challenged claim, for a court can take account of the inferences and creative steps that a person of ordinary skill in the art would employ.”

“[W]hen a patent ‘simply arranges old elements with each performing the same function it had been known to perform’ and yields no more than one would expect from such an arrangement, the combination is obvious.” *Id.* at 417 (quoting *Sakraid v. Ag Pro, Inc.*, 425 U.S. 273, 282 (1976)).

*KSR* also instructs “that when a patent claims a structure already known in the prior art that is altered by the mere substitution of one element for another known in the field, the combination must do more than yield a predictable result.” *Id.* at 416.

The admitted prior art in applicant’s Specification may be used in determining the patentability of a claimed invention. *In re Nomiya*, 509 F.2d 566, 570-71 (CCPA 1975); *In re Davis*, 305 F.2d 501, 503 (CCPA 1962).

According to *In re Peterson*, 315 F.3d 1325, 1329 (Fed. Cir. 2003):

In cases involving overlapping ranges, we and our predecessor court have consistently held that even a slight overlap in range establishes a *prima facie* case of obviousness. . . . We have also held that a *prima facie* case of obviousness exists when the claimed range and the prior art range do not overlap but are close enough such that one skilled in the art would have expected them to have the same properties. *Titanium Metals Corp. v. Banner*, 778 F.2d 775, 783, 227 USPQ 773, 779 (Fed. Cir. 1985).

#### ANALYSIS

Matsui teaches forming a heat shrinkable (multilayer) film containing the claimed amount of at least one block copolymer having a vinyl aromatic hydrocarbon and a conjugated diene in the claimed proportion and the claimed amount of a vinyl aromatic hydrocarbon polymer (corresponding to the claimed styrene type polymer), such as polystyrene or a high-impact polystyrene. Matsui teaches (col. 10, ll. 5-13) (emphasis added) that:

[T]he molecular weight and the molecular structure of the copolymer in the present invention can be controlled depending upon the purpose, by optionally changing the charge amount, *the timing of addition and the number of addition of the monomers*, the polymerization initiator, the randomizing agent, and the proton donating substance used for deactivation of active terminals (hereinafter referred to as “polymerization terminator”).

Consistent with the above disclosure, Reference Examples 20 and 21 of Matsui produce block copolymers using the same timing and number of addition of the same monomers used in Specification Examples 2 through 8

in the presence of the polymerization initiator (catalyst) and solvent used in Specification Examples 2 through 8 at the same temperature employed in Specification Examples 2 through 8. These block copolymers, according to Appellants at pages 45 to 54 and 65 of the Specification, contain the claimed micro phase separation structure having soft and hard phases.

Matsui teaches that the heat shrinkable film may be obtained by extruding a film and orienting the film uniaxially, biaxially or multi-axially (corresponding to the claimed requirement of orienting the film with at least a monoaxial direction). Matsui also teaches at col. 17, ll. 43-50, that “[w]hen such a film is used as a heat shrinkable label or a packaging material, the heat shrinkage factor is at least 15% at 80°C”. Further, Matsui exemplifies a heat shrinkable film having a heat shrinkage factor of greater than or equal to 20% at 80°C for 30 seconds.

Matsui does not mention that its styrene type polymer has a syndiotactic structure. However, Appellants do not dispute the Examiner’s finding at page 14 of the Answer that the styrene type polymer taught by Matsui generically includes a polystyrene polymer having a syndiotactic structure. More importantly, Appellants acknowledge that the use of a polystyrene type polymer having a syndiotactic structure in forming a heat shrinkable film was well known at the time of the invention. Moreover, Appellants acknowledge that using a styrene polymer having a syndiotactic structure, together with a styrene/diene type block copolymer, to form a multilayered oriented laminated film was well known at the time of the invention.

Given the above teachings, we determine that one of ordinary skill in the art would have been led to employ a conventional polystyrene polymer

having a well known syndiotactic structure as the styrene polymer of Matsui's resin composition containing a styrene/diene block copolymer and a styrene polymer, with a reasonable expectation of successfully forming a heat shrinkable film.

We have limited our discussion to the obviousness of the subject matter of claim 1. It is up to the Examiner and Appellants to determine the patentability of the subject matter recited in remaining pending claims 2 and 4 through 16.

### DECISION

The decision of the Examiner rejecting claims 1 through 23, 28, and 29 under 35 U.S.C. § 103(a) is reversed.

Claim 1 is newly rejected under 35 U.S.C. § 103(a) as unpatentable over the combined teachings of Matsui and the admitted prior art.

This Decision contains a new ground of rejection pursuant to 37 C.F.R. § 41.50(b). 37 C.F.R. § 41.50(b) provides "[a] new ground of rejection pursuant to this paragraph shall not be considered final for judicial review."

37 C.F.R. § 41.50(b) also provides that the Appellants, WITHIN TWO MONTHS FROM THE DATE OF THE DECISION, must exercise one of the following two options with respect to the new ground of rejection to avoid termination of the appeal as to the rejected claims:

(1) *Reopen Prosecution.* Submit an appropriate amendment of the claims so rejected or new evidence relating to the claims so rejected, or both, and have the matter reconsidered by the Examiner, in which event the proceedings will be remanded to the Examiner. . . .

(2) *Request rehearing.* Request that the proceedings be reheard under § 41.52 by the Board upon the same record. . . .

REVERSED

37 C.F.R. § 41.50(b)

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